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ON THE MANAGEMENT
OF
SEVERE INJURIES OF THE EYE.

BY

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THERE are few cases in surgery which involve a heavier or more anxious responsibility than those in which an eye has been injured so severely as to become a possible exciting cause of sympathetic ophthalmia, but not so severely as to preclude hope of its recovery with useful sight. There are, I believe, practitioners who adopt what our forefathers would have called "a short way" in such cases; and who invariably remove an injured eye in order, as they say, to afford security to the sound one, without very much consideration of the loss suffered by the patient. Such practice may be excellent rule of thumb, but it can hardly be called either science or surgery; for it is clearly the duty of the surgeon to be as conservative as circumstances will permit, and to preserve as much of any organ or endowment as may be possible. The fact that some injuries of the eye are followed by sympathetic ophthalmia of its fellow, and that this may entail total loss of sight, should never be absent from the memory; but, at the same time, it affords no excuse for the sacrifice of eyes in circumstances in which the danger does not exist, or in which it can be obviated or overcome. Every

case should be carefully studied in its details, and all its peculiarities should be fully weighed, before any decision is formed or acted upon.

C. C., a boy 8 years old, was sent to me by Dr. Ryley, of Great Yarmouth, on the 18th of August, 1892. The point of a toy arrow had entered his right eye a day or two previously, the wound of entrance being wholly within the limits of the cornea. There was traumatic cataract, with much swelling of the opaque lens, and some iritis. The cornea was transparent around the wound, perception of light and projection unimpaired. There was but little pain, and I decided upon attempting to save the eye. Iridectomy was performed on the following day, and most of the wounded lens was removed by suction. Matters progressed fairly well, and, on the 27th of the month, the child went home to be under Dr. Ryley's care. He returned to me for inspection on the 9th of September, when I found but little change, the eye still congested, the anterior chamber containing lymph, and vision not improved. The left eye was then perfectly normal. I told the friends that I feared it would not be possible to save useful sight in the injured eye, but that I would give the case another fortnight, after which, unless there were decided improvement, I should advise the performance of Mules's operation. The child went back to his country home on the next day, the 10th, but was hastily sent up again by Dr. Ryley on the 13th, in consequence of inflammation having com-

menced in the left eye. I saw him on the morning of the 14th, and found declared sympathetic ophthalmia of considerable severity. There were adhesions of the pupil, punctiform deposits on the inner surface of the cornea, and there was a considerable amount of lymph in the anterior chamber. In these circumstances, I feared to trust to a Mules's operation, and removed the injured eye the same morning, even although this proceeding is said to be of doubtful efficacy when once sympathetic ophthalmia is established. The child remained in a nursing home in London, where he was placed in a darkened room. A drop of a strong solution of atropine and cocaine was applied to the left eye every four hours, and a wafer containing $\frac{1}{2000}$ th of a grain of perchloride of mercury night and morning; a drachm of mercurial ointment was rubbed into the inner side of one thigh twice a day, and quinine was given internally. Under this treatment steady improvement occurred, the pupil became dilated, the adhesions yielded, and the lymph was absorbed. In about three weeks, and in view of the better condition, the mercurial inunction was omitted, but the omission was followed by speedy relapse. The ointment was at once resumed with good result; but, when it was again left off, a second relapse occurred. When this had yielded, the mercury was relinquished by degrees, very gradually and carefully, this time without accident, and the boy returned home at the end of January, 1893, practically quite well, and with nothing to show

what he had passed through except that the movements of the pupil were sluggish and imperfect, as if the iris stroma were still more or less pervaded by effused lymph. The normal activity was gradually restored; and, in March of this year, I found the eye perfectly well. It is hypermetropic to two dioptries; but, with a glass of this power, the distant vision is normal, and brilliant type is easily read in the hand. The mobility of the pupil is completely restored. Perhaps the most remarkable feature of the case was that the large amount of mercury administered never produced any unpleasant symptom. The boy, although healthy, would fairly have been described as delicate-looking when he received the injury. He improved greatly in general appearance during the four months of his stay in London, and is now strong and robust.

J. B., a boy of 10 years old, was playing with a toy percussion gun on the evening of the 25th of December, 1893. The hammer was not counter-sunk to inclose the cap and nipple, but struck with a flat surface, so that the fragments of an exploded cap were scattered in all directions, and a considerable piece entered the boy's left eye. He was brought to me on the morning of the 26th by Mr. Atkinson, of Wood Green, when I found a horizontal corneal wound below the area of the pupil, which was contracted, but through which the corner of a piece of copper could be seen lying behind the iris, the rest of the piece being concealed by the iris on the temporal side. On

the same day I performed iridectomy outwards, and extracted the piece of copper, which may have formed about one-fourth of the cylindrical portion of the cap. There was an insignificant loss of vitreous, but nothing was seen of the lens, which had apparently been dislocated by the injury. There was a good deal of pain after the operation, and on the following day the opaque lens showed itself in the pupillary space, and became adherent to the iris. A leech was applied to the temple, atropine and cocaine were freely used, and the irritation subsided, but did not entirely disappear until the absorption of the lens was completed. Vision continued to improve, and on the 29th of January I noted that the lens had disappeared and that several large test-types could be read with the assistance of a +10 glass. On the 26th of July the pupil had become an elliptical horizontal slit above the line of corneal cicatrix, the eye was of normal tension, white and quiet, and, on account of the smallness of the pupil, moderately large types could be read without assistance. A glass of +10 gave 8/20ths of normal vision, and, with +14, brilliant type could be read easily in the hand. The defensive field was perfect.

As far as the original character of the injuries was concerned, these two cases presented a remarkable degree of resemblance. In both the external wound was strictly limited to the cornea, in both there was traumatic cataract, and in both there was reason to believe that the deeper parts

of the eye had escaped. The chief point of difference was probably in the character of the missiles by which the injuries were respectively inflicted. In the first case, two boys had been playing with bows and arrows in a garden, shooting their arrows about at random and picking them up again, and they finally agreed to take each other's backs as targets, and to shoot in turn. My patient, being the target, thought the arrow long in coming, and turned his head to look for it, hence receiving it in his eye. The point was almost certainly loaded with septic material, which probably determined the character of the resulting inflammation. In the second case, the percussion cap had been in the boy's pocket; but it seems likely that the fragments were effectually sterilized by the heat of the explosion, and that what penetrated the eye was a piece of metal, clean in the surgical sense. It was impossible to overlook the great difference in the character of the iritis and of its products in the two cases; and I can recall several other instances in which inflammation of a distinctly septic character has followed upon injuries to the eye which were not at first of great apparent severity, but which were inflicted by dirty substances, such as chips of wood, old metallic pens, and so forth. We have been accustomed to believe that wounds of the ciliary region are especially apt to produce sympathetic ophthalmia; but, if we may regard this unfortunate consequence as being probably septic in its origin, it seems as if the old view would have to be reconsidered, and as

if it may have been at first based upon a deduction from a limited number of instances, and then transferred, with a strange and mischievous vitality, from one text-book to another. My experience of recent years would certainly induce me to attach very high importance to the question whether, in any case of injury, septic inoculation was likely to have occurred, and to watch very carefully for any indications in this direction which the character of the inflammation might afford. Chief among these characters I should place a tendency to extension or diffusion of the inflammatory process, a general turbidity of the contents of the anterior chamber, and an inclination on the part of the effused lymph to assume the characters of pus.

When the inflammation following injury to an eye assumes a definitely septic character, I should abandon, generally speaking, any expectation of preserving useful vision, and should make the safety of the uninjured eye the chief or even the sole consideration. Not only is the risk of sympathetic trouble much greater in such cases, but the septic inflammation itself is but little amenable to control, and is likely to extend to the choroid, and to produce softening and wasting of the globe. When once inflammation of a septic character is established, delay in dealing with it offers no advantages equivalent to the serious risks which such delay must entail.

What, then, should be done? Practically speaking, only two courses are open to the surgeon—the removal of the injured eye, or the per-

formance upon it of Mules's operation. In all ordinary circumstances I greatly prefer the latter; and, for some years past, have only performed enucleation under very special conditions.

In Mules's operation, the cornea and the whole contents of the eyeball being first removed, the sclerotic cavity is rendered thoroughly aseptic, and is then filled by a sterilized ball, of glass or silver, over which the edges of the sclera are united by sutures. The attachments of the muscles are left untouched, and the result is a globular stump, which moves perfectly with the sound eye in every direction, and which affords a firm support for an artificial one. There is no cavity behind the artificial eye to retain secretion, no painful pressure from its edges, and practically no limitation of its movements. When carefully made and fitted, it is not to be distinguished from a natural eye, and the patient soon becomes unconscious of its presence. I have performed Mules's operation in a very large number of cases, both in hospital and in private practice, upon patients ranging in age from nine months to seventy years, and my earlier cases have now been for eight years under observation. My experience is that the Mules' affords as much security against sympathetic ophthalmia as can be afforded by enucleation, that it is infinitely superior to enucleation in point of convenience, comfort and appearance, and that it is always to be preferred to enucleation excepting in very feeble and aged persons, in cases of malignant growth within the eye, and in

cases in which sympathetic ophthalmia has actually commenced. In all these I have performed enucleation; but, in the last-mentioned class, in deference to the opinion of others, rather than in accordance with my own. In all the ordinary circumstances in which enucleation is performed I regard the removal of the eye as a slovenly and unjustifiable mutilation.

I am quite aware that my favourable opinion of Mules's operation is dissented from by a certain number of ophthalmic surgeons, especially, I think, in London. The truth is that the operation, like many others, can only be brought to a successful issue by careful attention to many points of detail; and it has been tried and abandoned by some surgeons without this attention ever having been bestowed upon it. I once heard it condemned, in strong language, by a surgeon who admitted that he had never done it at all, and who, when pressed by me to give some reasons for his condemnation, could only say that the operation "was opposed to all his surgical instincts." I ventured to remind him of Paley's definition of instinct, as "an impulse, independent of reflection and prior to experience," and to add that, in my case, reflection and experience had alike led me to a different view. I asked him to formulate his objections in a paper for a medical society, and said that I would meet him in the discussion and would exhibit cases, but this offer he did not accept. I have heard of instances in which prejudicial results were said to have fol-

lowed the operation, but in these, as they were described to me, the essential conditions of success had not been fulfilled by the operators, who seemed not even to have made themselves masters of Dr. Mules's original description of the steps of his procedure, and still less of the various improvements in detail which have since been suggested by myself and others. The only objections to it, when correctly performed, which can be sustained in the face of a now very extensive experience, are that the edges of the sclera will sometimes fail to unite, and that the union, although apparently perfect when formed, will sometimes give way in the course of years and permit the escape of the ball. In either of these cases the resulting stump, formed by the collapsed sclera with its muscles retaining their natural attachments, is far superior to the best basis for an artificial eye which is ever left after enucleation. Failure of union, moreover, although not uncommon in the earlier cases, can be prevented with a very near approach to certainty by the proper selection and proper insertion of the sutures. With reference to the alleged "severity" of the operation, I may say that I performed it, on the 13th of last August, upon a little girl, 6 years of age; that the sutures were removed on the 20th, and that she went home well on the 23rd.

It cannot be said that we possess, as yet, any certain knowledge with regard either to the causes of sympathetic ophthalmia, or to the channel or channels through which these causes may be

conveyed ; and it is impossible to ignore the fact that very many diseases, altogether independent of injury, are apt to appear in the second eye after they have existed for some time in the first. Some of these, as, for example, the keratitis of inherited syphilis, must be regarded as being essentially of constitutional origin ; but it is none the less uncertain to what extent the appearance of the malady in the second eye may be due to such an origin, or to direct propagation through some unknown channel from the first. The uncertainty which envelops the causes of sympathetic ophthalmia, extends, almost necessarily, to the period of time during which these causes may be operative ; and forbids any positive conclusion as to the period at which the danger either commences or passes away. We know by experience that sympathetic ophthalmia seldom follows injury until at least five or six weeks after it has been inflicted ; but the exceptions to this rule are too numerous for the rule itself to be relied upon as a source of safety. In the case of C. C., for example, related above, only four weeks intervened ; and still shorter periods have been placed on record. The safe course would seem to be, if the character of the inflammation justifies any fear of sympathetic mischief, to proceed without delay to such operative procedure as may render its occurrence in the highest degree improbable. It is manifestly impossible to say how soon the causes of infection may depart from the injured eye on a journey which may conduct

them to the other ; and it is, therefore, impossible to declare that, at any given time, either enucleation or Mules's operation will confer absolute safety. The result must be tested by time before it can be looked upon as secure.

The experience afforded by the case of C. C., with regard to the influence of mercury in checking, I will even say in curing, sympathetic ophthalmia, is manifestly of the greatest clinical value and importance. The control of mercury over common plastic iritis has become a truism, but no similar control has hitherto been recorded in sympathetic cases, which have almost invariably gone on to destruction. It may fairly be asked whether something was not due to the quantity administered and to the method of administration. The way in which the omission of the inunction was twice followed by relapse was extremely remarkable, and seems to leave no room for doubt that this inunction was the cause of the improvement which was produced. The application of mercurial wafers to the eye itself was never suspended, and their action, therefore, was at best only subsidiary. Fortunately, there was nothing to interfere with the continuance of the treatment ; and it is interesting to consider how far such continuance would have been justifiable, as a security against otherwise unavoidable blindness, if symptoms of mercurial poisoning had shown themselves. How far might we conclude that such symptoms would indicate a greater susceptibility to the therapeutic as well as to the deleterious action of the mineral, and how far should we be

justified in hoping to bring about a cure by perseverance in smaller doses? How far, again, was the quinine of value, either as a bactericide, or as an aid to the system to resist the injurious effects of the mercury? The case bristles with problems of which the foregoing are but examples; and the instances of sympathetic ophthalmia are, fortunately, not sufficiently numerous to furnish data for any speedy solution of them. In the absence of such a solution, I think we have facts enough to supply us with certain definite propositions, which, in the present state of knowledge, may be accepted as guides to practice. As long as an injured eye is apparently aseptic, we may retain some hope of being able to guide it towards recovery; but, whenever the inflammation assumes a septic character, we should perform Mules' operation, or should enucleate, without unnecessary delay; and, whenever sympathetic ophthalmia becomes developed, we should carry the sustained administration of mercury by inunction, together with the internal administration of quinine, to the fullest limits which the condition and idiosyncracies of the patient will allow. I have more than once seen sympathetic ophthalmia stop short of the production of absolute blindness; but, prior to the case of C. C., I have never seen it completely cured. The conditions by which that cure was brought about should, I think, be made to repeat themselves, in other instances of the disease, with as much exactness as the circumstances of each case may render possible.

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